

# SIGNAL TRANSMISSION METHOD AND APPARATUS

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention relates to a video display apparatus, and particularly, to a signal transmission method and apparatus between appliances which is able to be connected as digital method.

### 2. Description of the Background Art

These days, A/V (Audio/Video) appliances are developed as digital method, and the digital A/V appliances are connected to each other by a digital network.

For example, a setup box and a digital TV are connected as IEEE 1394 digital method, digital A/V contents (programs) are transmitted using Isochronous Channel defined in IEEE 1394, and command language for control is transmitted to AV/C (Audio/Video Control) format using Asynchronous Transaction.

In addition, on-screen display (hereinafter, referred to as OSD) bitmap is transmitted through the Asynchronous Transaction using a method defined in an Asynchronous Connection protocol.

However, the bitmap image such as OSD transmitted between the A/V appliances is used to notify status or operation condition of the appliance, and transmission speed is an important element. However, if the image is transmitted through digital connect, the transmission speed is lowered.

That is, the Asynchronous Connection used in the IEEE 1394 standard is

a protocol originally used a transferring which should not include transfer error such as file transfer, and therefore, if the bitmap image such as OSD is transferred through the digital connect, the status and operation condition of the appliances can not be displayed as real-time.

Also, the bitmap image such as OSD is transmitted through the digital connect in the digital A/V appliances connected by the digital network, whereby the resolution is lowered, and the status and operation condition of the appliances are not easily recognized.

## SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide a signal transmission apparatus and method by which the appliances transmitting digital A/V (Audio/Video) contents are able to provide results of user input such as setting change as real-time through an analog connect, and are able to provide these results using a more delicately.

To achieve the object of the present invention, the digital AV contents are transmitted through a digital connect, and the OSD (On-Screen Display) for setting operation condition of the apparatus and controlling is transmitted through an analog connect in transmitting the AV contents and OSD by connecting a signal output apparatus and a signal input apparatus.

That is, according to the present invention, an analog connect is set, as well as digital connect, between the signal output apparatus transmitting the digital AV contents and the signal input apparatus receiving the corresponding digital contents.

When the OSD is wanted to be transmitted during the transmission of the

digital AV contents, a command is transmitted so that an input terminal of the signal input apparatus receiving the digital AV contents is changed from a digital terminal to an analog terminal. After that, in case that the needs to transmit the OSD is not required, a command ordering that the input terminal is changed from the analog terminal to the digital terminal is transmitted.

Even in case that the OSD is transmitted through the analog connect, the digital AV contents is continually transmitted through the digital connect.

In addition, the transmission of the OSD through the analog connect is made for the OSD of larger than a certain volume.

Therefore, in digital and analog connecting the signal output apparatus and the signal input apparatus according to the present invention, the signal output apparatus includes an OSD generating unit for generating the OSD for setting the operation condition or the control of the appliance will be controlled, and a first controlling unit deciding whether the OSD is transmitted through the analog connect or through the digital connect by checking the volume of the OSD, and controlling the OSD generating unit in accordance with the decision; and the signal input apparatus includes a video display unit for displaying the digital AV contents and the OSD transmitted from the signal output apparatus, and a second controlling unit for controlling the video display unit so that the input terminal is changed into the analog terminal when a transmission of the OSD more than a certain volume by information transmission with the signal output apparatus is detected.

The OSD generating unit includes a digital/analog (D/A) change unit for transmitting the OSD more than a certain volume through the analog connect, and the video display unit includes a video process unit for compounding and

processing the digital AV contents transmitted through the digital connect and the OSD in the D/A change unit in case that the OSD is displayed.

The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

In the drawings:

Figure 1 is a block diagram showing a connect between appliances according to an embodiment of the present invention; and

Figure 2 is a flow chart of operation for on-screen display according to the embodiment of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

Figure 1 is a block diagram showing an apparatus according to one embodiment of the present invention, as shown therein, there are provided a

signal output apparatus 100 including an A/V (Audio/Video) data source 120  
encoding digital AV contents and transmitting them by MPEG TS (Motion Picture  
Experts Group-Transport Stream) format, an OSD (On-Screen Display) generating  
unit 130 generating OSD displaying status or operation condition of the appliances  
5 which will be controlled, a D/A (Digital/Analog) change unit 140 changing the OSD  
in the OSD generating unit 130 into analog signal in case of transmission through  
analog path, and a controlling unit 110 deciding whether a transmission path of the  
OSD is an analog path or a digital path by checking the volume of OSD while  
controlling the AV data source 120 and transmitting the decision to the OSD  
generating unit 130 and the appliances displaying the digital AV contents; and a  
signal input apparatus including an MPEG decoder 220 processing the MPEG TS  
signal from the signal output apparatus transmitting the digital AV contents and  
outputting audio and video signal, a video processing unit 230 compounding the  
video signal from the MPEG decoder 220 and the OSD from the signal output  
apparatus 100, a video display unit 240 displaying the digital AV contents and the  
OSD on screen on being inputted the video output signal from the video  
processing unit 230, and a controlling unit 210 displaying the digital AV contents  
by controlling the MPEG decoder 220 while transmitting/receiving the data with the  
controlling unit 110 included in the signal output apparatus 100 and switching the  
20 video input terminal of the video display unit according to the decision of the path  
in the controlling unit 110 in OSD display mode; and these are connected through  
digital and analog connects.

The operation and effect of the embodiment according to the present  
invention will be described with reference to the figure 2.

When a user chooses an appliance transmitting the wanted AV contents

(the signal output apparatus 100 in Figure 1) using a remote controller or key matrix of an appliance receiving the digital AV contents (the signal input apparatus 200 in Figure 1), a digital connect is set between the signal output 100 and the signal input apparatus 200.

5        When the digital connect is set, the signal output apparatus 100 transmitting the digital AV contents controls the AV data source 120 so that the controlling unit 110 transmits the digital AV contents to the signal input apparatus 200 through the digital connect, and the signal input apparatus 200 receiving the digital AV contents controls the MPEG decoder 220 so that the controlling unit 210 displays the AV contents on the screen of the video display unit 240.

At that time, the MPEG decoder 220 outputs the video signal to the video processing unit 230, and at the same time, outputs the audio signal to the audio processing unit 250 by performing the signal processing on being inputted the digital AV contents of MPEG TS format from the signal output apparatus 100.

15        Accordingly, the video display unit 240 being inputted the video signal through the video processing unit 230 displays the digital AV contents on screen, and at the same time, the audio processing unit 250 being inputted the audio signal outputs an voice signal corresponding to the digital AV contents.

20        After that, if the user pushes a certain key on the remote controller of the signal output apparatus 100 in order to display user inputs and results of the inputs of identifying information about the signal output apparatus 100 receiving the digital AV contents or changing the operation condition of the signal output apparatus 100 as the OSD form, the controlling unit 110 decides whether the volume of the OSD is larger than a certain volume set before or not.

25        At that time, if the volume of the OSD which is about to be displayed is

smaller than a certain volume, the controlling unit 110 controls the OSD generating unit 130, so that the OSD is generated and transmitted to the signal input apparatus 200 through the digital connect, and transmits the status that the OSD is transmitted through the digital connect to the controlling unit 210 of the signal input apparatus 200.

Accordingly, the signal input apparatus 200 controls the video processing unit 230 so that the controlling unit receives the OSD from the OSD generating unit 130 through the digital connect and displays it on the screen of the video displaying unit 240, whereby the user is able to identify or to perform setting operation for the corresponding input.

If the volume of the OSD is judged to be larger than a certain volume, the controlling unit 110 controls the OSD generating unit 130 so that the OSD is outputted through the analog connect, not through the digital connect, and informs the controlling unit 210 of the signal input apparatus 200 of that fact.

At that time, when the OSD generating unit 130 generates the OSD corresponding to the user input, the D/A change unit 140 changes the OSD into an analog OSD signal and transmits the signal to the signal input apparatus 200 through the analog terminal.

Accordingly, in the signal input apparatus 200, the video processing unit 240 receives the video signal from the MPEG decoder, and at the same time, receives the OSD signal through the analog terminal by the control of the controlling unit 210, and the OSD signal is outputted to the video display unit 240 after a certain signal process is performed, whereby the digital AV contents and the OSD are displayed on the screen and the user is able to perform identifying or setting operation for the corresponding input.

After that, if the user ends the OSD display or the OSD display is no more needed because of passing a certain time during the OSD is receive through the analog terminal, the controlling unit 110 controls the OSD generating unit 130 so that the generation of OSD is ended and the ending is informed to the controlling unit 210 of the signal input apparatus 200.

Accordingly, the video processing unit 230 changes the analog terminal for receiving the OSD into the digital terminal by control of the controlling unit 210 of the signal input apparatus 200.

That is, if the volume of the OSD is larger than a certain volume, the OSD is transmitted through the digital connect in the conventional art, and therefore lowering of transmission speed happens. However, according to the present invention, the OSD is transmitted through the analog connect, whereby the user is able to see the digital AV contents and the OSD as real-time.

On the other hand, for identifying the operation condition and setting the controlling of an appliance, the remote controller of the appliance is used. However, the digital connect between the signal input apparatus 200 and the signal output apparatus 100 is able to be made, so the OSD screen for setting the operation and controlling of the signal output apparatus 100 is able to be displayed using the remote controller of the signal input apparatus 200, whereby the user is able to input for the signal output apparatus 100 even if the signal output apparatus 100 is located in a place where the signal input apparatus 200 is not located.

On the contrary, on the side of the signal output apparatus 100, identifying of the operation and setting the control for the signal input apparatus 200 are able to be made.



As described above, according to the present invention, a graphic OSD of large amount such as identifying the status of an appliance or changing setting is transmitted through an analog interface, whereby the OSD of large amount is able to be provided as real-time while the digital AV contents are provided as the digital form.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalence of such meets and bounds are therefore intended to be embraced by the appended claims.